Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (cancelled)

Claim 2 (currently amended): The device of claim [[1]] 5, wherein each of the first and second refraction elements includes a Wollaston Prism element.

Claim 3 (currently amended): The device of claim [[1]] 5, wherein the first and second polarization orientation elements each consists of a Faraday rotator element having two or more reversed magnetic domains arranged such that the states of polarization of the two parallel light beams of an optical signal are rotated in opposite directions.

Cancel Claim 4 (original): The device of claim 3, wherein the first and second PBS films are arranged such that the optic axis of each points in a direction that is approximately 45° relative to the propagation axis and approximately 45° relative to a third axis that is perpendicular to both the propagation and refraction axes.

Claim 5 (currently amended): An optical circulator device for coupling three or more optical fiber ports, the device comprising:

first and second refraction elements each having a refraction axis perpendicular to a propagation axis, wherein each refraction element is arranged so that light traveling in a forward direction parallel to the propagation axis and having a first linear polarization orientation is refracted by a first angle relative to the refraction axis along a refraction plane defined by the propagation and refraction axes, and light traveling in a forward direction parallel to the propagation axis and having a second linear polarization orientation perpendicular to the first polarization orientation is refracted by a second angle along the refraction plane opposite the first angle, wherein the first and second refraction elements are arranged opposite each other relative to the propagation axis, with anti-parallel refraction axes and with parallel refraction planes so

that light refracted by one refraction element is refracted back parallel to the propagation axis by the other refraction element;

first and second polarization orientation elements coupled to opposite ends of the first and second refraction elements, respectively, ~~The device of claim 1, wherein~~ the first and second polarization orientation elements each ~~includes~~ including a Faraday rotator element and a bi-layer waveplate film deposited thereon; and

first and second polarization beam splitting (PBS) films deposited on said first and second polarization orientation elements, respectively, wherein the end face of each of the first and second PBS films opposite the polarization orientation elements defines one or more port coupling regions each for coupling light signals from an optical fiber port, wherein the first and second PBS films are dimensioned and arranged so as to split a light signal in a forward direction into two parallel beams of light linearly polarized perpendicular to each other, and to combine parallel beams of light linearly polarized perpendicularly to each other in the reverse direction into a single beam of light;

wherein the first polarization orientation element is arranged with respect to the first refraction element and the first PBS film so as to orient the polarization of both of the parallel light beams of a first optical signal propagating along a forward direction from a first port coupling region on the first PBS film parallel to the first linear polarization orientation so that both beams are refracted by the first angle by the first refraction element, and to orient the polarization of two beams linearly polarized parallel to each other propagating in the reverse direction so that they are polarized perpendicular to each other; and

wherein the second polarization orientation element is arranged with respect to the second refraction element and the second PBS film so as to orient the polarization of both of the parallel light beams of a second optical signal propagating along a forward direction from a second port coupling region on the second PBS film parallel to the second linear polarization orientation so that both beams are refracted by the second angle by the second refraction element, and to orient the polarization of two beams linearly polarized parallel to each other propagating in the reverse direction so that they are mutually perpendicular;

whereby the first optical signal passes from the first port coupling region to the second port coupling region, and the second optical signal passes from the second port coupling region to a third port coupling region.

Claim 6 (original): The device of claim 5, wherein the first and second PBS films are deposited on the first and second Faraday rotator elements, respectively, such that the first and second waveplate films are coupled to the first and second refraction elements, respectively.

Claim 7 (original): The device of claim 5, wherein the first and second PBS films are deposited on the first and second waveplate films, respectively, such that the first and second Faraday rotators are coupled to the first and second refraction elements, respectively.

Claim 8 (original): The device of claim 5, wherein each of the first and second Faraday rotator elements has two or more reversed magnetic domains, and wherein each is arranged such that the states of polarization of the two parallel light beams of an optical signal are rotated in opposite directions.

Claim 9 (original): The device of claim 5, wherein each of the first and second Faraday rotator elements is uniformly poled such that the states of polarization of the two parallel light beams of an optical signal are rotated in the same direction, wherein one or more portions of each of the first and second waveplate films has been removed, and wherein each waveplate film is arranged and dimensioned such that the state of polarization of only one of the two parallel light beams of an optical signal is rotated.

Claim 10 (original): The device of claim 9, wherein the first and second PBS films are arranged such that the optic axis of each points in a direction that is approximately 45° relative to the propagation axis and approximately 45° relative to a third axis that is perpendicular to both the propagation and refraction axes.

Claim 11 (original): The device of claim 5, wherein the first and second PBS films are arranged such that the optic axis of each points in a direction that is approximately 45° relative to the propagation axis and in the plane defined by the propagation axis and a third axis perpendicular to both the propagation and refraction axes.

Claim 12 (currently amended): The device of claim [[1]] 5, wherein the first and second refraction elements are arranged relative to each other such that the center-to-center spacing of port coupling regions on each of the first and second PBS films is between about 100μm and about 400μm.

Claim 13 (currently amended): The device of claim [[1]] 5, wherein each of the first and second PBS films is deposited using a source material selected from the group consisting of Silicon (Si), and Ge.

Claim 14 (currently amended): The device of claim [[1]] 5, wherein each of the first and second polarization orientation elements includes a Faraday rotator element formed in part by depositing a magnetic garnet film on a non-magnetic substrate.

Claim 15 (original): The device of claim 14, wherein the garnet film is deposited using liquid phase epitaxy (LPE).

Claim 16 (original): The device of claim 14, wherein the garnet film is grown in the form: $RE1_aRE2_bBi_{3-a-b}Fe_{5-c-d}M1_cM2_dO_{12}$, where RE1 and RE2 are each selected from the group consisting of La, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Yb, and Lu, and wherein M1 and M2 are each selected from the group consisting of Ga, Al, In and Sc.

Claim 17 (original): The device of claim 14, wherein each of the first and second Faraday rotator elements has two or more reversed magnetic domains arranged such that the states of polarization of the two parallel light beams of an optical signal are rotated in opposite directions.

Claim 18 (original): The device of claim 14, wherein each of the first and second Faraday rotator elements has a substantially uniform magnetic profile such that the states of polarization of the two parallel light beams of an optical signal are rotated in the same direction.

Cancel Claim 19 (original): The device of claim 14, wherein each of the first and second polarization orientation elements further includes a waveplate film formed by depositing a bi-layer film on the respective Faraday rotator element.

Claim 20 (currently amended): The device of claim [[19]] 14, wherein the thickness of each waveplate film along the propagation axis is between about 5μm and about 20μm.

Claim 21 (currently amended): The device of claim [[19]] 14, wherein one or more portions of each of the first and second waveplate films have been removed, and wherein each of the first and second waveplate films are arranged such that the state of polarization of only one of the two parallel light beams of an optical signal is rotated by each waveplate film.

Claim 22 (currently amended): The device of claim [[1]] 5, wherein the thickness of each PBS film along the propagation axis is between about 0.25mm and about 0.5mm.

Claim 23 (withdrawn): An optical circulator device for coupling three or more optical fiber ports, the device comprising:

first and second refraction elements each having a refraction axis perpendicular to a propagation axis, wherein each refraction element is arranged so that light traveling in a forward direction parallel to the propagation axis and having a first linear polarization orientation is refracted by a first angle relative to the refraction axis along a refraction plane defined by the propagation and refraction axes, and light traveling in a forward direction parallel to the propagation axis and having a second linear polarization orientation perpendicular to the first polarization orientation is refracted by a second angle along the refraction plane opposite the first angle, wherein the first and second refraction elements are arranged opposite each other relative to the propagation axis, with anti-parallel refraction axes and with parallel refraction planes so that light refracted by one refraction element is refracted back parallel to the propagation axis by the other refraction element;

first and second polarization orientation elements coupled to opposite ends of the first and second refraction elements, respectively;

a polarization beam splitting (PBS) film deposited on said first polarization orientation element, wherein the end face of the PBS film opposite the first polarization orientation element defines three or more port coupling regions for coupling light signals from two or more optical fiber ports, wherein the PBS film is dimensioned and arranged so as to split a light signal in a forward direction into two parallel beams of light linearly polarized perpendicular to each other, and to comb

a reflection element coupled to the second polarization orientation element opposite the second refraction element, wherein the reflection element is arranged such that the beam components of a light signal propagating in the forward direction are reflected back in the reverse direction;

wherein the first polarization orientation element is arranged with respect to the first refraction element and the PBS film so as to orient the polarization of both of the parallel light beams of a first optical signal propagating along a forward direction from a first port coupling region on the PBS film parallel to the first linear polarization orientation so that both beams are refracted by the first angle by the first refraction element, and to orient the polarization of two beams linearly polarized parallel to each other propagating in the reverse direction so that they are polarized perpendicular to each other; and

wherein the second polarization orientation element rotates the polarization state of each of the parallel light beams of the first optical signal propagating along the forward direction by 45° in one direction, and wherein the second polarization orientation element rotates, by 45° in the same direction, the polarization state of both of the parallel light beams of the first optical signal propagating along the reverse direction after being reflected by the reflection element such that both beams are parallel to the second linear polarization orientation, and such that both beams are refracted by the second angle by the second refraction element;

whereby the first optical signal passes from the first port coupling region to the second port coupling region.

Claim 24 (withdrawn): The device of claim 23, wherein each of the first and second refraction elements includes a Wollaston Prism element.

Claim 25(withdrawn): The device of claim 23, wherein the first polarization orientation element consists of a Faraday rotator element having two or more reversed magnetic domains arranged such that the states of polarization of the two parallel light beams of an optical signal are rotated in opposite directions.

Claim 26 (withdrawn): The device of claim 23, wherein the PBS film is arranged such that the optic axis points in a direction that is approximately 45° relative to the propagation axis

and approximately 45° relative to a third axis that is perpendicular to both the propagation and refraction axes.

Claim 27 (withdrawn): The device of claim 23, wherein the first polarization orientation elements includes a Faraday rotator element and a bi-layer waveplate film deposited thereon.

Claim 28 (withdrawn): The device of claim 27, wherein the PBS film is deposited on the first Faraday rotator element such that the waveplate film is coupled to the first refraction element.

Claim 29 (withdrawn): The device of claim 27, wherein the PBS film is deposited on the waveplate film such that the first Faraday rotator is coupled to the first refraction element.

Claim 30 (withdrawn): The device of claim 27, wherein the first Faraday rotator element has two or more reversed magnetic domains, and is arranged such that the states of polarization of the two parallel light beams of an optical signal are rotated in opposite directions.

Claim 31 (withdrawn): The device of claim 23, wherein the elements of the device are dimensioned such that the center-to-center spacing of port coupling regions on the PBS film is between about 100μm and about 400μm.

Claim 32 (withdrawn): The device of claim 23, wherein each of the first and second polarization orientation elements includes a Faraday rotator element formed in part by depositing a magnetic garnet film on a non-magnetic substrate.

Claim 33 (withdrawn): The device of claim 32, wherein the first Faraday rotator element has two or more reversed magnetic domains arranged such that the states of polarization of the two parallel light beams of an optical signal are rotated in opposite directions, and wherein the second Faraday rotator element has a substantially uniform magnetic profile such that the states of polarization of the two parallel light beams of an optical signal are rotated in the same direction.

Claim 34 (withdrawn): The device of claim 32, wherein each of the first and second Faraday rotator elements have a substantially uniform magnetic profile such that the states of polarization of the two parallel light beams of an optical signal are rotated in the same direction.

Claim 35 (withdrawn): The device of claim 32, wherein the first polarization orientation element further includes a waveplate film formed by depositing a bi-layer film on the first Faraday rotator element.

Claim 36 (withdrawn): The device of claim 35, wherein one or more portions of the first waveplate film has been removed, and wherein the first waveplate film is arranged such that the state of polarization of only one of the two parallel light beams of an optical signal is rotated by the first waveplate film.

Claim 37 (withdrawn): The device of claim 23, wherein the reflection element includes a thin metallic film layer deposited on the second polarization orientation element.

Claim 38 (withdrawn): The device of claim 23, wherein the reflection element includes one or more dielectric layers deposited on the second polarization orientation element.

Claim 39 (withdrawn): An optical circulator device for coupling three or more optical fiber ports, the device comprising:

first and second refraction elements each having a refraction axis perpendicular to a propagation axis, wherein each refraction element is arranged so that light traveling in a forward direction parallel to the propagation axis and having a first linear polarization orientation is refracted by a first angle relative to the refraction axis along a refraction plane defined by the propagation and refraction axes, and light traveling in a forward direction parallel to the propagation axis and having a second linear polarization orientation perpendicular to the first polarization orientation passes through unrefracted, wherein the first and second refraction elements are arranged opposite each other relative to the propagation axis, with anti-parallel refraction axes and with parallel refraction planes so that light refracted by one refraction element is refracted back parallel to the propagation axis by the other refraction element;

first and second polarization orientation elements coupled to opposite ends of the first and second refraction elements, respectively; and

first and second polarization beam splitting (PBS) films deposited on said first and second polarization orientation elements, respectively, wherein the end face of each of the first and second PBS films opposite the polarization orientation elements defines one or more port coupling regions each for coupling light signals from an optical fiber port, wherein the first and second PBS films are dimensioned and arranged so as to split a light signal in a forward direction into two parallel beams of light linearly polarized perpendicular to each other, and to combine parallel beams of light linearly polarized perpendicularly to each other in the reverse direction into a single beam of light;

wherein the first polarization orientation element is arranged with respect to the first refraction element and the first PBS film so as to orient the polarization of both of the parallel light beams of a first optical signal propagating along a forward direction from a first port coupling region on the first PBS film parallel to the first linear polarization orientation so that both beams are refracted by the first angle by the first refraction element, and to orient the polarization of two beams linearly polarized parallel to each other propagating in the reverse direction so that they are polarized perpendicular to each other; and

wherein the second polarization orientation element is arranged with respect to the second refraction element and the second PBS film so as to orient the polarization of both of the parallel light beams of a second optical signal propagating along a forward direction from a second port coupling region on the second PBS film parallel to the second linear polarization orientation so that both beams pass through the second refraction element unrefracted, and to orient the polarization of two beams linearly polarized parallel to each other propagating in the reverse direction so that they are mutually perpendicular;

whereby the first optical signal passes from the first port coupling region to the second port coupling region, and the second optical signal passes from the second port coupling region to the third port coupling region.

Claim 40 (withdrawn): The device of claim 39, wherein each of the first and second refraction elements includes a Rochon Prism element.

Claim 41 (withdrawn): The device of claim 39, wherein the first and second polarization orientation elements each includes a Faraday rotator element and a bi-layer waveplate film deposited thereon.

Claim 42 (withdrawn): The device of claim 41, wherein the first and second PBS films are deposited on the first and second Faraday rotator elements, respectively, such that the first and second waveplate films are coupled to the first and second refraction elements, respectively.

Claim 43 (withdrawn): The device of claim 41, wherein the first and second PBS films are deposited on the first and second waveplate films, respectively, such that the first and second Faraday rotators are coupled to the first and second refraction elements, respectively.

Claim 44 (withdrawn): The device of claim 41, wherein each of the first and second Faraday rotator elements has two or more reversed magnetic domains, and wherein each is arranged such that the states of polarization of the two parallel light beams of an optical signal are rotated in opposite directions.

Claim 45 (withdrawn): The device of claim 41, wherein the first and second PBS films are arranged such that the optic axis of each points in a direction that is approximately 45° relative to the propagation axis and in the plane defined by the propagation axis and a third axis perpendicular to both the propagation and refraction axes.

Claim 46 (withdrawn): The device of claim 39, wherein the first and second refraction elements are arranged relative to each other such that the center-to-center spacing of port coupling regions on each of the first and second PBS films is between about 100μm and about 400μm.

Claim 47 (withdrawn): The device of claim 39, wherein each of the first and second PBS films is deposited using a source material selected from the group consisting of Silicon (Si),and Ge.

Claim 48 (withdrawn): The device of claim 39, wherein each of the first and second polarization orientation elements includes a Faraday rotator element formed in part by depositing a magnetic garnet film on a non-magnetic substrate.

Claim 49 (withdrawn): The device of claim 48, wherein the garnet film is deposited using liquid phase epitaxy (LPE).

Claim 50 (withdrawn): The device of claim 48, wherein the garnet film is grown in the form: $RE1_aRE2_bBi_{3-a-b}Fe_{5-c-d}M1_cM2_dO_{12}$, where RE1 and RE2 are each selected from the group consisting of La, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Yb, and Lu, and wherein M1 and M2 are each selected from the group consisting of Ga, Al, In and Sc.

Claim 51 (withdrawn): The device of claim 48, wherein each of the first and second Faraday rotator elements has two or more reversed magnetic domains arranged such that the states of polarization of the two parallel light beams of an optical signal are rotated in opposite directions.

Claim 52 (withdrawn): The device of claim 48, wherein each of the first and second polarization orientation elements further includes a waveplate film formed by depositing a bi-layer film on the respective Faraday rotator element.

Claim 53 (withdrawn): The device of claim 52, wherein the thickness of each waveplate film along the propagation axis is between about 5μm and about 20μm.

Claim 54 (withdrawn): The device of claim 39, wherein the thickness of each PBS film along the propagation axis is between about 0.25mm and about 0.5mm.